

**THE THYROID AND ITS RELATION TO PREGNANCY AND
THE PUERPERAL STATE.**

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The importance of the relation which the ductless glands bear to the functions of the human organism in health and disease, has received the serious attention of the medical profession for some years. It is believed that with the large number of cases which occur in the service of this Hospital, valuable observations may be made of the condition of the thyroid gland in pregnancy and throughout the puerperal state.

In an article read by Doctor Charles H. Mayo before the Section on Surgery of the American Medical Association at the sixty-second annual session held at Los Angeles, June, 1911, he states it is becoming more and more apparent that, of the various ductless glands, the thyroid is one of the most important in its control over the body metabolism, as well as in the maintenance and stimulation of the function of many of the associated glands.

Rogers, in a paper read at the same meeting, asserts that from his observations the thyroid secretion has some connection with oxidation and that by thyroid feeding in myxedema or cretinism, the consumption of oxygen can be markedly increased. Likewise the amount of heat given out from the body can be correspondingly augmented. Conversely, experimental thyroidectomy leads to a diminution in the absorption of oxygen. This secretion also has to do with carbohydrate and nitrogenous metabolism and certain recent experiments seem to connect nitrogenous metabolism in the liver directly with the thyroid.

Other observers have brought out the fact that during active sexual life there is an evident increase in the activity of the thyroid gland as shown by its increased vascularity and size, which does not appear to be pathological. The enlargement, however, is more apt to occur in subjects who are poorly developed and of a neurotic temperament.

In order to better understand the thyroid in its relation to pregnancy and the puerperal state, a brief outline of its embryological development may aid in elucidating its action in adult life.

Minot states in his text-book, that the thyroid gland begins as a median evagination of the entoderm on the ventral side of the pharynx at an early stage (human embryo of 3 mm.). The blind end of the evagination becomes first bilobed, then branching, the branches being analogous to the adult follicles. The duct of the gland is soon obliterated but its point of origin is often permanently marked by the foramen cecum at the back of the tongue.

Arthur Keith of London describes it thus: At a very early period (fourth week) while the buccal and pharyngeal parts of the tongue are appearing as elevations on the floor of the primitive pharynx, the hypoblast in the middle of the furrow between those two parts of the tongue proliferates and forms a solid outgrowth. The bud thus formed grows downward and backwards and soon bifurcates. The bifurcated extremity after redivision to form a network of acini, becomes the isthmus and part of the lateral lobes of the thyroid. The stalk of the bud represents the thyro-glossal duct, the buccal opening of the duct remaining as the foramen cecum. It seems probable that this part of the thyroid, at least, was originally a gland which poured its secretion into the mouth.

Kocher, in describing the anatomy, says: The thyroid gland is situated underneath the superficial muscles of the neck, platysma, sternocleidomastoid, sternohyoids, sternothyroids, and omohyoids, and is surrounded

by a thin layer of the deep cervical fascia, which forms the external thyroid capsule. Along the posterior and median portions of the gland this capsule is adherent to the connective tissue envelop of the trachea, pharynx, and esophagus; hence the thyroid gland moves up and down with the trachea and esophagus during the act of swallowing,—a point of importance in the symptomatology and diagnosis. One layer of the deep cervical fascia forms the sheath for the large vessels of the neck which come in relation with the posterior, outer portion of the thyroid along its entire length. In the external thyroid capsule are a large number of thyroid veins, the *venae accessories*. This external capsule also receives muscular fibers from the cricothyroid and sternothyroid muscles, which fibres have been described as muscles of the thyroid gland. On the median posterior aspect of the thyroid gland, in a groove between the esophagus and the trachea, the external capsule contains the recurrent laryngeal nerve.

The blood supply of the thyroid gland is derived from two symmetric arteries, rather large compared to the size of the organ. The superior thyroid artery reaches the upper pole of the thyroid gland, having a convexity directed upward and inward. Before entering the thyroid gland it divides into two branches, a large anterior and a small posterior branch. The anterior branch can usually be felt on the surface of the upper lobe along its anterior and median side as far as the isthmus, and gives off a separate branch, which is sometimes quite large, to supply the pyramidal process. In most cases the posterior branch enters the upper horn of the gland immediately below the bifurcation, but occasionally it can be felt along the posterolateral surface of the gland. With rare exceptions the inferior thyroid artery is given off from the subclavian artery. In its upward course it describes a curve with the convexity directed inward and upward, underneath the common carotid and in front of or behind the recurrent laryngeal nerve, to reach the posterior external surface of the lateral lobe, where it divides just before entering the gland substance into two, rarely more than two, branches. The arteries are accompanied by several veins which bear the same names as the arteries; those which accompany the superior thyroid artery are more numerous and larger than the *venae comites* of the inferior vessels. In many cases there is a third artery, the *arteria thyroidea ima*, usually on one side only. It is a direct branch of the innominate artery and runs to the thyroid isthmus. At the lower pole of the gland the large *venae thyroidea imae* are given off; their course is fairly straight and directly into the innominate veins. At the upper and lower border of the isthmus the two sides of the gland are connected by large veins, the *venae communicantes superiores et inferiores*. These numerous blood vessels break up in the interior of the gland and form smaller branches, which ultimately surround each individual gland tube as a capillary network and come directly in contact with the gland cells. The gland is accordingly

extremely vascular and its volume varies within wide limits in accordance with the amount of blood it contains. Similar plexuses are formed by the lymph-vessels and lymph-clefts, which unite to form small trunks on the surface of the gland, especially the anterior median portion of the lobes, and empty chiefly into the superior cervical glands. This lymphatic network becomes much enlarged in large colloid tumors of the thyroid gland.

The nerves of the thyroid gland accompany and surround the blood vessels; they are derived from the superior ganglion of the sympathetic and from superior and inferior laryngeal branches of the pneumogastric. No secretory fibres have as yet been discovered, but the capsule of the thyroid gland contain sensory nerves.

Having outlined the embryology and anatomy of the thyroid gland, we will now review briefly the work that has already been done by others from a purely obstetrical point of view. Not a few authors have contributed to this subject, but the articles by Freund and Lange seem to be the most instructive in the methods of studying the gland in its relation to the pregnant and puerperal woman.

Freund investigated the relations of the thyroid gland to the female sexual organs on the basis of observations made upon fifty pregnant women in the Strassburg Obstetrical Clinic. The method and course of the examination was as follows: In each case, a careful anamnesis was obtained concerning hereditary, endemic and sexual influences upon the goitre formation: then the neck was inspected and palpated, taking into consideration only such enlargements of the thyroid as could be readily grasped with the fingers and which were usually visible to the eye. Finally the circumference of the neck was determined by means of a tape measure, Figures thus obtained have no absolute value, for a circumference of the neck of 38 cm. does not necessarily point to the existence of thyroid hypertrophy. But these figures possess considerable relative value for a given case, because very sharp and distinct differences are brought out by a comparison of the figures obtained by neck measurements taken in pregnancy during and after delivery, and in the puerperal period. Freund acknowledges that he is well aware of possible sources of error in the determination of these figures, as this method may show not only the swelling of the thyroid gland, but also the general swelling of the cervical structures. He has convinced himself, however, that this procedure is more useful than measuring the gland alone, because the accurate determination of its boundaries is very difficult, often impossible, so that there are no fixed points for measuring.

For the neck measurements, Freund (following the advice of his father) designated a normal line which encircled the neck above the prominent seventh cervical vertebra and comprised the largest circumference of the thyroid gland, about $1\frac{1}{2}$ cm. below the thyroid cartilage. These measurements served to show a distinct enlargement of the thyroid

gland in 45 of the fifty women examined. He believes that in the course of the first three days of the puerperal period, the circumference of the neck undergoes a diminution in the majority of the cases. This decrease in the circumference of the neck averaged one cm., the figures fluctuating between one-half and one and a half cm.; two cm. was noted in only a single instance.

In a later article he arrives at the conclusion that the relations of the thyroid gland and the mammary gland with the pregnant or diseased female genitals are established not through the nerves, but predominantly through the blood.

Lange also made a study of the condition of the thyroid gland in all pregnant women who came under his observation; and whenever possible, a careful examination of the organ was made at the end of the puerperal period. The thyroid gland was registered as "enlarged" when its contours as a whole, or the area of a single lobule, were found to be distinctly marked on inspection, and could be differentiated from the surrounding tissues by palpation. This procedure he stated, affords sufficiently reliable information of thyroid gland enlargement in any given case: for a thyroid of normal size cannot be demonstrated at all, or at least cannot be mapped out distinctly from the surroundings, depending on the adipose tissue present. The result of this examination is unreliable, however, when one wishes to ascertain a slight increase in the volume of a gland which is already enlarged. Repeated measuring of the greatest circumference of the neck naturally suggests itself, for calculating, at least indirectly, the further growth of the thyroid.

Lange at first carried out such comparative measurements, following the example of Freund; but these were promptly abandoned as a routine procedure, because the results appeared too uncertain. The predisposition of numerous pregnant women to accumulate fat, as well as the swelling of the entire cervical region in the first hours after childbirth, especially after prolonged labor, modify the circumference of the neck so greatly, that small variations in repeated measurements, do not justify any conclusions as to the increase or decrease of the size of the thyroid gland. The measurements are only reliable for such a purpose in individuals having a long, slender neck. In most cases he therefore limited himself to the determination of the fact, whether the thyroid was enlarged, or unchanged. The condition of the organ was noted not only in pregnant women, but also soon after delivery. The examination in the last group was postponed until twenty-four hours after childbirth, because before this time one cannot be sure that the hyperemia of the cervical organs, due to interference with respiration during the labor pains, has altogether disappeared. When the thyroid gland is found to be distinctly enlarged on the second day after childbirth, the enlargement has already existed prior to delivery. This follows with certainty from the statements of Freund, which Lange is enabled to confirm, after numerous observations on women

before and after delivery. Women who had recently aborted were grouped under the same heading as pregnant women. The clinical material was exclusively derived from regions free from endemic goitre.

Lange's tables in the first place confirm the statement of Freund to the effect that the thyroid gland almost regularly undergoes an increase in volume during pregnancy, which subsides again in the puerperal period. It also follows from the compilation that a clinically demonstrable enlargement of the thyroid does not yet exist in the first three months of pregnancy. Such an enlargement was noted only when it was already present prior to the pregnancy. The same remark seems to apply to the fourth month. Among the multiparae, the majority present an enlarged thyroid as early as the fifth month, whereas among the primiparae, those were more numerous in whom this phenomenon was not distinct until the sixth month. With only two exceptions, multiparous women presented the same type of thyroid enlargement in different pregnancies; *i.e.*, the swelling involved the same lobules.

Pre-existing goitres according to Freund, increase in size during the period of gestation. Lange was enabled to confirm this observation in his three cases, but there was no growth of the cystic and degenerated portions of the gland. The goitre became more voluminous only through an increase in bulk of the noncystic portion.

Concerning the subsequent fate of the enlarged thyroid of pregnancy, Freund believes that the organ undergoes a decrease in size during the first three days after delivery, followed by a further decrease on the seventh day in one-half of the cases, while in the other half there occurs an increase. Lactation is said to be devoid of an influence of any kind. He paid no attention to such fluctuations, because their occurrence can only be controlled by measurements of the circumference of the neck. These can only be made reliable, however, in very exceptional cases, with unusually thin necks, to ascertain differences of one-half to one cm.

Freund desired to ascertain the effect of thyroïdin upon the physiological enlargement of the thyroid in pregnancy. Of course, only such women were selected who were found to be perfectly healthy on careful examination (also of the urine), and who feared possible persistence of the goitre, on account of the pronounced enlargement of the neck. The mere demonstration of the presence or absence of thyroid enlargement was not sufficient for the purpose, but it was also necessary to recognize any fluctuations in the volume of the gland. Hence only those cases could be utilized in which the conditions were especially favorable for the examination of the thyroid, namely, a long and slender neck, in which a reliable result is afforded by repeated measurements and second, a notable increase in the size of the middle lobe of the gland, with a moderate cushion of fat. The superficial location of this portion of the thyroid and its direct application to the solid trachea permit a reliable estimation of its thickness by palpation. In fact, a sufficiently clear idea of the thick-

ness can be obtained, so as to recognize positively a change that is not too slight in character. The lateral lobes are not adapted to this direct observation because they are covered by a thicker layer of soft parts.

Freund's experience with the administration of thyroïdin and iodothyryn were gathered from ten suitable cases.

Illustrative case (Freund):

Para vi; age, 40 years; last menstruation, October 20th, 1895. Moderate swelling of the neck always noted in previous pregnancies. In the present pregnancy, the goitre first appeared early in April, 1896, gradually increased in size, and was apparently larger than ever before. On examination of this very thin individual on June 10th, 1896, the entire thyroid was found to be essentially enlarged. Consistency, soft throughout. The irregularities of the trachea could not be palpated through the isthmus. Circumference of neck, 37.5 cm. Findings otherwise normal. Prescription: two iodothyryn tablets daily (containing 0.2 iodine). June 14th: Thyroid gland small; lateral lobes, only indistinctly palpable. Circumference of neck, 37 cm. June 17th: Circumference of neck, 35.5 cm. Lateral lobes, not demonstrable. Middle lobe very thin, so that the trachea could be easily palpated. Contours of neck, normal. The iodothyryn was stopped. June 26th: Condition unchanged. July 27th: Normal birth of a strong living child. Puerperal period normal. October 2nd: lateral lobes not palpable. Middle lobe just barely demonstrable, on account of the very thin neck. The thyroid gland was accordingly not enlarged.

Freund's conclusions are stated as follows: The effect of thyroid gland preparations upon the goitre of pregnancy is favorable and positive. The administration of moderate doses was always followed in five to seven days by a distinct decrease, and in eleven to fourteen days after the beginning of the medication, by the complete subsidence of the thyroid enlargement. The entire behavior of the goitre of pregnancy during and after thyroid medication, and the general experience concerning the reaction of parenchymatous goitres to thyroid gland preparations, serve to show that the enlargement of the thyroid gland during pregnancy is referable, not to simple hyperemia, but to an increase in the mass of the glandular substance.

An interesting article on the subject of "Thyroid Disease in Pregnancy" by Dr. E. P. Davis of Philadelphia, appears in this issue of the BULLETIN.

Although both Freund and Lange were unable to make any set rules for measuring the thyroid gland, owing to the impossibility of devising a method that would be accurate, we have made these measurements in all our cases in the hope that some light might be thrown on the subject, but from a careful study of our own results in the 97 cases where the thyroid was palpable, the results are no more satisfactory. It was found in most of the women examined by us that they never wore tight-fitting collars so that they had no means of judging the time when their necks first began to enlarge.

In a study of the blood examinations made in most of the cases, there was a very small percentage of abnormalities, and these were accounted

CONFINEMENT No.

THYROID CHART

APPLICATION No.

Name

FAMILY HISTORY

PERSONAL HISTORY

Menstruation

GOITER first noticed Age Month of Pregnancy Day of Puerperium

Influence of later Pregnancies

Hyperthyroidism first noticed during Pregnancy (month) Puerperium (day) Nervous Strain

Puerperal Infection

other complications

ONSET Acute Subacute Gradual Previous Goiter Water Supply

Course of disease

GOITER (Palpation) Rt. Lobe, Median Lobe, Left Lobe, Location, High, Medium Low Prominent
EYES, Exophthalmos Steiwag's Von Grafe's Mobius' Pupils Eye Grounds Diffuse
Beneath Sternum
Thrill

LARYNX

TONSILS

CIRCULATORY SYSTEM Heart Palpitation Size Pulse Arteries Veins Blood Pressure

Murmurs

Sounds

Anasarca

Ascites

GENERAL STRENGTH Nutrition Inability to step on table CHEST, Inspir. Expir. Patellar Reflex

NERVOUS SYSTEM

Tremor

Chorea

Mental Symptoms

SKIN Moisture

Pigmentation

Hyperaemia

BLOOD Red cells

Haemoglobin

White cells

URINE

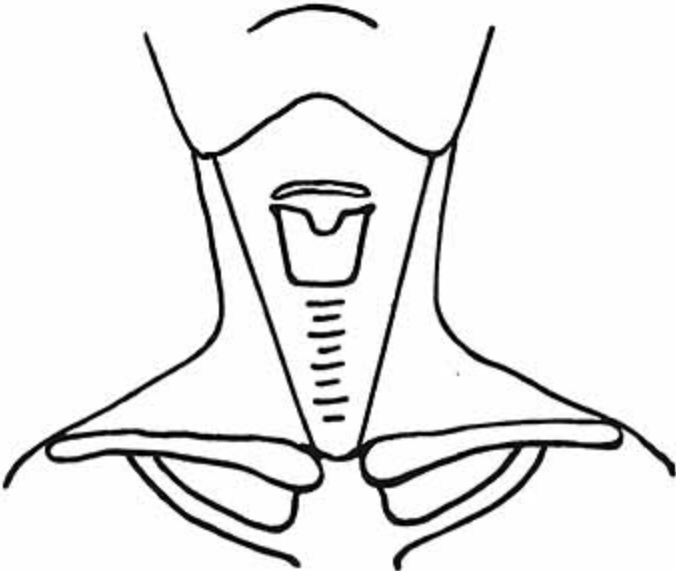
Sp. gr.

Alb.

Sugar

Casts

First portion of chart, employed in tabulating statistics of individual cases examined.

SYMPTOMS AT DIFFERENT STAGES	MEASUREMENT OF NECK		
	High	Medium	Low
Dysphonia	cm.	cm.	cm.
Weight			
Gen. Strength			
Pulse Rate			
Pain			
Headache			
Insomnia			
Chorea			
Diarrhoea			
Vomiting			
Nausea			
Oedema			
Dyspnoea			
Palpitation			
Tachycardia			
Exophthalmos			
Tremor			
Golter			
Hyperthyroidism			
Nervousness			
Time of Onset			
Deg. of Severity of Onset			
Time of Max. Severity			
Severity at present time			
Antepartum DATE			
During Confinement After Confinement			

NOTE: 1-Slight 2-Moderate 3-Extreme

Continuation of thyroid chart, the outline cut being inserted here for convenience, but is placed below on the regular chart.

for by pathological conditions in no way connected with the thyroid. Most careful analyses of the urine were made in all cases, with negative results; likewise no definite deductions could be made out in regard to the thyroid in its relation to toxemia.

In order that the observations might be uniform in character, the accompanying chart was made after study of similar charts used in other institutions, more especially that of the Mayo. Upon these charts the records of one thousand pregnant women were taken and then analyzed, with the result that only 98 cases out of the 1000 showed any signs of thyroid involvement, or 9.8 per cent., so that it will be necessary to continue the investigation further in order that a sufficient number be recorded to afford more satisfactory deductions.

In the hope that others might be stimulated to take up the same work, this preliminary report is published giving a brief outline of the 98 cases, together with a summary of some of the more important points brought out by the investigation.

BRIEF SUMMARY OF THE 98 CASES OF PREGNANCY IN WHOM THE THYROID GLAND SHOWED PERCEPTIBLE CHANGES FROM THE NORMAL.

Primiparae.

1. Russian. Age 20. Two years in U. S. Good health. Small goitre observed at 11 years, one year before menstruation began. No change at menstruation or pregnancy. No change postpartum.

2. American. Age 21. Has always lived in New York. Rather painful menstruation beginning at 16 years. Small goitre observed at 17 years, one year after menstruation began. No change in pregnancy. Diminished 2 cm. postpartum.

3. Armenian. Age 20. Good health. Small goitre noticed by patient at time menstruation began. No change or symptoms in pregnancy or postpartum.

4. Austrian. Age 22. Good health. Small goitre since childhood. No change observed by patient at beginning of menstruation at 16 years. No distinct change in pregnancy. None postpartum.

5. Austrian. Age 24. Good health. Thyroid enlargement noticed by patient in third month of pregnancy. No change in later months or postpartum.

6. English. Age 19. Goitre began at time of beginning of menstruation at 15 years. Latter normal. Goitre grew larger during last four months of this pregnancy. No symptoms. 0.5 cm. smaller postpartum. Adenomatous type, right lobe considerably larger than left.

7. Austrian. Age 26. In U. S. seven years. Good health. Sister and several relatives have goitres. Goitre first seen at time menstruation began. Patient observed no change during pregnancy. No symptoms. Moderate sized goitre; enlargement uniform. Circumference diminished 1 cm. postpartum.

8. Swiss. Age 25. In U. S. two years. Good health. Sister has a goitre. Goitre first seen at the age of 20, between menstruation and

marriage. Lived in Zurich, Switzerland at the time. No symptoms. No change observed during pregnancy or postpartum. Goitre uniformly enlarged. Adenomatous type.

9. German-American. Age 21. Lived in New York all her life. Patient noticed small goitre one year before marriage, at the age of 20. No change during pregnancy or postpartum. No symptoms. Enlargement uniform.

10. German-American. Age 20. In U. S. all her life. Good health. Goitre noticed during childhood. (Mother and sister have goitres without symptoms.) Goitre became smaller after menstruation at 17 years of age. Some nervous symptoms at this time (hyperthyroidism?) which have since disappeared. No change during this pregnancy. No symptoms. Goitre is firm, uniformly enlarged, rather small and apparently of adenomatous type.

11. American. Colored. Age 20. Lived in New York all her life. Good health. No goitre noticed by patient. Enlargement is slight and uniform. No symptoms. No change postpartum.

12. German. Age 21. In U. S. five years. Good health. Menstruation began at 18 years, irregular. Small goitre not noticed by patient. No symptoms. No change postpartum.

13. Italian. Age 25. In U. S. two years. Small goitre not noticed by patient. Patient seen at term. No symptoms. No change postpartum.

14. Jewish-American. Age 32. Always lived in New York. Good health. Married at 31 years. Goitre noticed by patient in the fifth month of this pregnancy. No symptoms. Patient seen at term. Goitre small, uniform enlargement. No changes observed postpartum.

15. Hungarian. Age 21. Good health. Menstruation began at 18 years, often irregular. Small goitre not noticed by patient when seen at term. No symptoms. One cm. diminution in circumference postpartum.

16. Russian. Age 26. In U. S. three years. Good health. Small goitre seen at the end of the seventh month. No symptoms. No change postpartum.

17. American. 18 years. Good health. Small goitre seen at the end of the eighth month. No symptoms. No change postpartum.

18. American Jew. Age 20. In New York all her life. Good health. Small goitre not previously noticed by patient. Observed at term. No symptoms. No change postpartum.

19. Austrian. Age 25. In U. S. four years. Good health. A small goitre observed at term. Had not been noticed previously by the patient. No symptoms. No change postpartum.

20. Austrian. Age 22. Good health. A small goitre observed at term. Had not been noticed previously by the patient. No symptoms. No change postpartum.

21. Spanish. Age 18. In U. S. ten years. Good health. A small goitre observed at term. Had not been noticed previously by the patient. No symptoms. No change postpartum.

22. Russian. Age 21. In U. S. four years. Good health. A small goitre observed at term. Had not been noticed previously by the patient. No symptoms. No change postpartum.

23. Austrian. Age 20. In U.S. four years. Good health. A small goitre observed at term. Had not been noticed previously by the patient. No symptoms. No change postpartum.

24. Russian. Age 22. Good health. No symptoms. A small goitre observed at term. One cm. diminution postpartum.

25. Austrian. Age 20. Good health. A small goitre observed at term. Had not been noticed previously by the patient. No symptoms. No change postpartum.

26. Austrian. Age 20. In U.S. three years. Good health. A small goitre observed at term. Had not been noticed previously by the patient. No symptoms. No change postpartum.

27. Austrian. Age 22. Good health until this pregnancy. A small goitre observed at term. Mother has large goitre but no symptoms. No thyroid symptoms observed in patient. No change postpartum. Moderate toxemia of pregnancy during last two weeks. Delivery normal. Goitre is small and enlargement uniform.

28. American. Mulatto. 19 years. Always lived in New York. Good health. Thyroid enlargement observed in the sixth month of this pregnancy. No symptoms. Diminished one and five-tenths cm. postpartum. Small goitre, uniform enlargement.

29. American. Age 22. Always lived in New York. Father and mother of husband and patient's mother died of pulmonary tuberculosis. Patient has had symptoms resembling mild hyperthyroidism for about three years. Improved after marriage one year ago. History of painful menstruation. Moderate exophthalmos. Pulse averages 90. Nervous symptoms greatly improved after delivery. Exophthalmos unchanged. Neck measurements unchanged postpartum. The thyroid was not distinctly palpable.

30. Russian. Age 28. History of poor health for three years. A small goitre observed. Not previously noticed by the patient. Cardiac and toxemia case. Symptoms referable to latter. Inevitable abortion three and one-half months. Thyroid diminished one cm. two weeks postpartum.

31. American. Age 20. Lived in New York all her life. Unmarried. Good health. Small goitre observed at the end of the sixth month. Patient had labor pains at the time. Inevitable abortion took place at the end of the sixth month. No pathological reason for abortion found. No change postpartum in thyroid. No thyroid symptoms.

32. Russian. Age 22. Poor health due to heart disease for about four years, probably longer. Small goitre observed at the end of the sixth month. Not noticed by patient until attention was called to it. No thyroid symptoms. Mitral lesion with dilatation and broken compensation. Marginal placenta previa, still-birth, 7 months. Subsequent improvement in cardiac condition. No change in thyroid measurements. Goitre small, low and enlargement uniform.

33. American Jew. Age 18. Always lived in New York. Good health. Small goitre present since childhood. Painful menstruation. No change observed in thyroid during pregnancy or after delivery. No thyroid symptoms.

34. Irish. Age 19. Four years in U.S. Good health. Goitre observed at the end of the third month of present pregnancy. Gradual

increase in size up to time of confinement. No thyroid symptoms. Slight decrease in size postpartum. Goitre is small, low and enlargement uniform.

35. German. Age 20. In U. S. four years. Good health, except painful menstruation. Time of onset indefinite, but before pregnancy. No change observed during pregnancy. Fair size goitre, firm, uniformly enlarged. No thyroid symptoms. No change postpartum.

36. Italian. Age 21. In U. S. fifteen years. Good health. Goitre observed at the end of the seventh month. No thyroid symptoms. Little or no change postpartum. Enlargement is firm and uniform.

37. Austrian. Age 24. In U. S. one and a half years. Good health. Goitre observed at the end of the fifth month. Increased gradually in size up to term. No thyroid symptoms. Goitre quite prominent, firm and uniform enlargement. Little or no change in ten days postpartum. Not observed since.

38. Hungarian. Age 20. In U. S. three years. Goitre observed at term. Enlargement uniform and fairly prominent. No thyroid symptoms. Little or no change postpartum. Probably adenomatous type.

39. Canadian. Age 28. In New York one year. Small goitre observed at the end of the sixth month. Uniform enlargement, firm consistency and rather small. Patient very nervous all her life. Convulsions before some of menstrual periods which were always painful. Toxemia and nephritis during this pregnancy. Subsequent premature labor. Thyroid diminished one cm. postpartum.

40. Hungarian. Age 18. In U. S. three and a half years. Good health. Small goitre observed at term. No thyroid symptoms. No change postpartum.

41. Irish. Age 33. Good health. Small goitre observed at term, consisting chiefly of the right lobe which feels cystic. No symptoms. No change postpartum.

42. American Jew. Age 22. Always lived in New York. Good health. Small goitre observed at term. No thyroid symptoms. Mitral regurgitation with good compensation. No change in thyroid observed.

43. Hungarian. Age 23. In U. S. six years. Good health before pregnancy. Admitted to Hospital for pelvic abscess. Small goitre observed six weeks postpartum. Had not been noticed previously by patient. No thyroid symptoms. Goitre small, low, firm, enlargement uniform.

44. Russian. Age 20. Good health. Small goitre observed at term. No thyroid symptoms. No change postpartum. Enlargement firm and uniform.

45. Armenian. Age 16. Always lived in New York. Good health. Small goitre seen at the end of the third month. Remained about the same size until delivery. No thyroid symptoms. Diminished 1 cm. postpartum.

46. American Jew. Age 22. Always lived in New York. Good health. Small goitre observed at term. No thyroid symptoms. No change postpartum.

47. Armenian. Age 19. Lived in New York since childhood. Good health except appendicitis one year ago. Small goitre observed at term. No thyroid symptoms. No change postpartum.

48. Russian. Age 20. Four years in U. S. Good health. Small goitre observed at term. No thyroid symptoms. No change postpartum.

49. American Jew. Age 21. Lived in New York all her life. Good health. Goitre observed in the seventh month of pregnancy. Increased slowly until delivery. No thyroid symptoms. Goitre of moderate size, uniform, rather soft. At ten days postpartum, circumference over goitre had increased 1 cm. Patient has a sister who recently developed a goitre in the sixth month of her first pregnancy but has no symptoms.

50. Austrian. Age 22. In U. S. five years. Good health. Small goitre observed at term. Patient noticed no increase in size of neck during pregnancy. No thyroid symptoms. Diminished 1 cm. postpartum.

51. German-American. Age 22. Lived in New York all her life. Good health. Small goitre observed at term. No thyroid symptoms. No change postpartum.

52. Italian. Age 24. In U. S. one year. Good health. Small goitre observed at term. No thyroid symptoms. No change postpartum.

53. German. Age 27. In U. S. four years. Good health. Small goitre observed at term, which was firm, uniform enlargement. No thyroid symptoms. No change postpartum. Sister living in Germany has had small goitre for many years. Had five children; pregnancies did not seem to affect goitre.

54. Russian. Age 23. Three and a half months in U. S. Good health. Small goitre observed at term. No thyroid symptoms. No change postpartum.

55. German. Age 20. In U. S. three years. Good health. Small goitre observed at term. No thyroid symptoms. Diminished 1 cm. in ten days postpartum.

56. American. Age 19. Lived in New York all her life. Patient had always had good health. Her mother had a goitre, but patient thinks the mother had no thyroid symptoms. Patient felt "nervous" from fifth month on. Examined in latter part of seventh month when a rather small, firm, uniformly enlarged thyroid was found, together with symptoms of moderate hyperthyroidism. Slight exophthalmos. Pulse 112. Tremor. Slight dyspnea. Between end of seventh month and delivery at term, the symptoms increased slightly as did the goitre. Delivery normal. Immediately after delivery, the symptoms subsided. By the fifth day postpartum pulse had changed from 112 to 84. Dyspnea and tremor were gone. Circumference of neck over goitre diminished 1 cm. and consistency seemed softer. The bruit was less distinct. Condition was about the same when patient left the hospital. No subsequent observations.

57. Polish. Age 20. In U. S. three years. Good health. Small goitre observed at term. No thyroid symptoms. No change postpartum.

58. Irish. Age 23. In U. S. five years. Good health. Goitre since childhood. Apparently grew a little larger about the time of marriage 2½ years ago. Patient observed no change during this pregnancy. No thyroid symptoms. No change postpartum. Enlargement consists chiefly of right lobe and feels cystic. Patient's grandmother had a large goitre. Patient's brother had a very large one and was operated on in a Dublin Hospital. Neither relative apparently had any hyperthyroidism. Patient is a native of South Ireland (Galway) and stated that numerous goitres are observed in this region.

59. Austrian. Age 21. In U. S. five years. Good health. Mother had a goitre. Mother and patient came from a region in Austria where goitres are prevalent, usually without symptoms. Goitre in patient observed at 15 years, two years after menstruation began. No change in thyroid observed since by patient. No thyroid symptoms. Diminished 1 cm. postpartum.

60. German. Age 21. In U. S. three and a half years. Married two years. Good health. Small goitre observed at term. No thyroid symptoms. No change postpartum.

61. Irish. Age 27. In U. S. six years. Married 9 months. Good health. Small goitre observed at term. No thyroid symptoms. No change postpartum.

62. Austrian. Age 20. Good health. Small goitre observed in seventh month. No thyroid symptoms. No subsequent change before or after delivery.

63. Austrian. Age 22. In U. S. four years. Good health. Small goitre observed in seventh month. No thyroid symptoms. Patient not aware of existence of goitre. No distinct subsequent change.

64. German-American. Age 19. Always lived in New York. Good health. Observed in sixth month. Small goitre. No thyroid symptoms. No subsequent change observed.

65. American Jew. Age 19. Always lived in New York. Good health. Small goitre observed in the beginning of ninth month. No thyroid symptoms. No subsequent change observed.

Multiparae.

66. Para ii. Born in New York. Age 27. Family history negative. Noticed swelling in thyroid region about time of menstruation. Swelling increased but little after first noticed. Always nervous but has been better for past two years. Twice pregnant. Miscarriage each time. Operation six weeks ago for pus tube. Goitre is small, firm, uniform, rather low. Slight exophthalmos which has always been present. No symptoms of hyperthyroidism.

67. Russian. In U. S. one year. Age 26. Para ii, each a miscarriage. Noticed a small swelling in thyroid region since time she began to menstruate or perhaps before that. Swelling has changed very little. Patient noticed no change during pregnancies. Measurements in hospital showed no change. No symptoms. Goitre is small, low, uniformly enlarged. Firm consistency.

68. Austrian. Age 28. In U. S. fourteen years. Para iii. Family history negative. Small swelling noticed in thyroid region when fourteen years old, two years after menstruation began. Good health until about six years ago when in fifth month of first pregnancy. At this time a rapid increase in the size of the goitre took place together with exophthalmos. Nervousness, rapid pulse and other symptoms of hyperthyroidism, all increasing as pregnancy went on. She reached term, however, and delivered a normal child. After delivery the goitre and the symptoms diminished very much in the course of a few weeks but did not entirely disappear. About three years later, she became pregnant again. The goitre increased rapidly from onset of pregnancy and the symptoms of

hyperthyroidism became severe. Premature labor took place at 6½ months. After delivery there was some diminution in the size of the goitre and in the severity of the symptoms, the latter remained fairly severe, however, and the patient was nervous and incapacitated. Was under medical treatment for about one year with little or no permanent improvement. Thyroidectomy was then done by Dr. Rogers in Bellevue Hospital. Went to the country for a month after operation, and immediately afterwards became pregnant. This pregnancy and delivery were perfectly normal. Patients at present entirely normal.

69. Para ii. Age 24. Born in Hungary. In U. S. four years. Good health. Family history negative. A swelling appeared in thyroid region, chiefly on right side, about seven years ago, about one year after menstruation began. It increased in size gradually during about three months and since then has remained stationary. Two pregnancies have had no apparent influence. No symptoms referable to thyroid at any time. Goitre is rather small, almost entirely to right of midline, soft, of uniform consistency. Patient's general condition is good. Confinement normal.

70. Para vi. Age 36. Born in Austria. In U. S. twenty years. Good health except for "nervousness" during past nine years. Family history negative. Goitre first noticed fifteen years ago during last month of first pregnancy. Patient has not observed any definite changes in the goitre with relation to the succeeding pregnancies though it has gained in size somewhat from time to time. For the past nine years has had frequent headaches, and has been nervous. Has frequently had attacks of sweating and palpitation from slight causes. General health, however, has been fairly good. Goitre is of moderate size, uniformly enlarged, rather low, of firm consistency. Has a rather soft and rapid pulse—90-100 and a somewhat nervous appearance; there are no other symptoms.

71. Para xi. German. Age 40. In U. S. twenty-four years. Goitre appeared in the seventh month of eleventh pregnancy. Mild hyperthyroidism symptoms with appearance of goitre. After confinement symptoms disappeared, goiter remained, though slightly diminished in size.

72. Para v. Austrian. Age 36. In U. S. ten years. Goitre noticed in fifth month of fifth pregnancy. Mild hyperthyroidism with appearance of goitre, persisting with little increase until delivery; then were relieved. Goitre grew somewhat smaller during two weeks postpartum. Not observed since.

73. Para v. Canadian. Age 28. Goitre appeared at twelve years of age, one year after menstruation began and followed articular rheumatism with endocarditis. Five pregnancies have had little or no effect on goitre or caused thyroid symptoms. Premature labor, due to cardiac condition.

74. Para ii. Hungarian. Age 24. Goitre appeared about the time of the beginning of menstruation, and remained stationary until about the end of third month of first pregnancy, when there was a marked increase in size, but no symptoms. After delivery thyroid remained enlarged. No thyroid change or symptoms observed in present pregnancy. Nephritis and early toxemia symptoms just before labor. Delivery normal, nephritis cleared up during postpartum period. No thyroid change postpartum.

75. Para vii. U. S. Age 36. Goitre appeared in the ninth month of the fourth pregnancy and has apparently remained unchanged since. No symptoms at any time.

76. Para ii. U. S. Age 23. Good health. First pregnancy normal. No thyroid enlargement observed. Second pregnancy two years later; in second month of this pregnancy, there was a sudden thyroid enlargement together with well marked and increasing symptoms of hyperthyroidism. The goitre and symptoms increased until about the middle of the fourth month, when they remained nearly stationary, with periods of temporary improvement and relapse during the next three months. At 6½ months premature labor took place. The goitre diminished in size and the symptoms greatly improved for about one month postpartum and then increased within two weeks to a marked degree. Improvement began almost at once under treatment and has continued for the past two months. The goitre is large, and has shown only slight change.

NOTE: A recent examination, 5 months postpartum, shows patient again pregnant, at the end of the second month. During the past two weeks the symptoms of hyperthyroidism which had continued to be slight or absent during the past three months have markedly increased. The goitre has not increased in size, but the consistency seems firmer and more tense.

77. Chinese woman. Age 24. Para ii. Enlarged thyroid observed at the end of the eighth month. No symptoms. No subsequent change observed before or after delivery.

78. Irish. Age 24. Para ii. Enlarged thyroid observed at term. No symptoms. No definite change postpartum.

79. Russian. Age 21. Para iii. Enlarged thyroid observed at term. No symptoms. No subsequent change.

80. Austrian. Age 38. Para iii. Enlarged thyroid observed at term. No symptoms. No subsequent change.

81. Hungarian. Age 36. Para vii. Enlarged thyroid observed at term. No symptoms. No subsequent change.

82. Greek. Age 24. Para ii. Small goitre observed at term. No symptoms. No subsequent change.

83. Polish. Age 23. Para ii. Small goitre noticed one month postpartum. Patient admitted for sub-acute appendicitis and salpingitis. Thyroid enlargement had not been noticed by patient. No symptoms or subsequent change in thyroid observed.

84. Austrian. Age 23. Para iv. Inevitable abortion. Three previous pregnancies terminated the same way. Small goitre, which showed no subsequent change. No symptoms.

85. Italian. Age 28. Para iv. Three normal pregnancies. In the present developed eclampsia. Eight months child which died in three hours. Small goitre observed in eighth month. No symptoms except those of toxemia. After two months postpartum, thyroid showed 1 cm. diminution. Patient was still nervous and somewhat hysterical. Urine normal.

86. Austrian. In U. S. fifteen years. Age 39. Para x. Goitre noticed by patient towards the close of the second pregnancy fifteen years ago, a few weeks after coming to U. S. No symptoms at this time. Normal confinement. Eight subsequent pregnancies have had little or no effect on the goitre. No change in present postpartum period.

87. Born and lived in Lowell, Mass. Age 24. Para iv. Pregnancy preceding present one terminated in a miscarriage. Has mitral regurgi-

tation with only fair compensation. Father's sister has a large goitre. Patient's mother has a smaller goitre. Neither have thyroid symptoms. Patient has a small goitre. Uniformly enlarged, of firm consistency. No symptoms of hyperthyroidism. Goitre diminished 1 cm. postpartum.

88. Austrian. Ten years in U. S. Age 32. Para iii. Patient noticed goitre in latter months of first pregnancy eight years ago. No symptoms. No subsequent change in following pregnancies.

89. U. S. Age 20. Para ii. Previous pregnancy terminated in a miscarriage. Small goitre present since time menstruation began six years ago. No change observed during pregnancies. No symptoms. Goitre is firm, rather low, right lobe somewhat larger.

90. Russian. Three years in New York. Age 24. Para ii. Goitre noticed five years ago during latter months of first pregnancy. No symptoms. No definite change during present pregnancy. Patient thinks it may have decreased somewhat. No change observed postpartum. Goitre is quite prominent, the right lobe somewhat larger. Distinct bruit over right lobe, not so distinct over left lobe. Of uniform consistency.

91. Russian. In U. S. ten years. Para iii. Patient noticed thyroid enlargement in ninth month of first pregnancy seven years ago. No symptoms. She observed no change in subsequent pregnancies. Was seen at the time of third pregnancy. Goitre is of moderate size, firm, enlargement firm. No symptoms. No change postpartum.

92. Irish. Age 31. Para iv. Thyroid enlargement noticed by patient before marriage. Time of onset uncertain. No symptoms. Patient observed no change in four pregnancies. No change observed postpartum after fourth confinement. Goitre is fairly prominent, right lobe considerably larger than left. Uniform, firm consistency. No symptoms.

93. Austrian. In U. S. three years. Age 21. Para ii. Small goitre observed at term. Had not been noticed by the patient. No symptoms. No change postpartum.

94. Italian-American. Age 27. Para v. Small goitre observed at term. Had not been noticed by the patient. No symptoms. No change postpartum.

95. German. Age 28. Para ii. Unruptured ectopic gestation, operation. Small goitre observed. Time of origin unknown. It had not been noticed by the patient. No thyroid symptoms. No change in thyroid after operation.

96. Italian. In N. Y. seven years. Age 29. Para ii. One miscarriage. Small goitre observed at the time. No symptoms. Circumference over thyroid diminished 1 cm. postpartum.

97. Polish. Age 37. Para iii. Small goitre observed at term in third pregnancy. No symptoms. No change postpartum.

98. German. In U. S. two years. Age 32. Para ii. Goitre appeared rather suddenly a few weeks after coming to New York two years ago. Not pregnant at this time. No symptoms observed with onset. About six months before goitre appeared, patient had pleurisy with effusion—2500 cc. aspirated from left pleural cavity. No occurrence. No signs of active tuberculosis at present. No change in goitre during present pregnancy. No symptoms. Goitre is moderate in size and the enlargement is chiefly of the right lobe. Consistency firm and uniform. No change postpartum.

SUMMARY.

Of the 1000 cases observed, 550 were primiparae and 450 multiparae. 97 cases of enlarged thyroid were found in 64 primiparae and 33 multiparae. A family history of goitre was present in 8 cases (7 primiparae; 1 multiparae). In 6 primiparae there was a history of menstrual disturbance.

Hyperthyroidism was present in varying degrees in 7 cases and probably in one other case, although there was no palpable thyroid in this case.

Time at which Thyroid Enlargement was First Noticed.

Primiparae, 64
Multiparae, 33
97

In Primiparae.

Before pregnancy, 12.

Of these, six occurred in childhood, three at time of menstruation and three between menstruation and marriage.

During pregnancy, 18.

Of these 18 cases known to have commenced during pregnancy, the enlargement was observed as follows:

In the third month,	3 cases
" " fifth	" 3 "
" " sixth	" 5 "
" " seventh	" 5 "
" " eighth	" 1 case
" " ninth	" 1 "

Doubtful, 34 cases

In these cases, the patients were observed at about term and the thyroid found enlarged. The patients had not observed any changes in the neck. It is probable that in the majority of these cases the thyroid enlargement began sometime during pregnancy.

In Multiparae.

Before pregnancy, 8 cases.

Of these, four were observed at the time menstruation began and four between menstruation and marriage.

During pregnancy, 12 cases.

The twelve cases in which the exact time of enlargement in pregnancy is known is as follows:

9th month,	1st	pregnancy,	para	vi
7th "	11th	"	"	xi
5th "	5th	"	"	v
9th "	4th	"	"	vii
2nd "	2nd.	"	"	ii
8th "	2nd	"	"	ii
8th "	4th	"	"	iv
9th "	2nd	"	"	x
8th "	1st	"	"	iii
8th "	1st	"	"	ii
9th "	1st	"	"	iii

Doubtful, 13 cases.

The same remarks apply here as in the doubtful cases in primiparae.